



Critical review of life cycle assessments conducted on aquaculture systems: identification of environmental improvements

Bohnes, Florence Alexia; Hauschild, Michael Zwicky; Schlundt, Jørgen; Laurent, Alexis

Published in:
Book of Abstracts, Sustain 2017

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Bohnes, F. A., Hauschild, M. Z., Schlundt, J., & Laurent, A. (2017). Critical review of life cycle assessments conducted on aquaculture systems: identification of environmental improvements. In *Book of Abstracts, Sustain 2017* [F-1] Technical University of Denmark.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Critical review of life cycle assessments conducted on aquaculture systems: identification of environmental improvements

Florence Bohnes^{1*}, Michael Z. Hauschild¹, Jørgen Schlundt² and Alexis Laurent¹.

1: Division for Quantitative Sustainability Assessment (QSA), DTU Management, DK.

2: Food Technology Centre (NAFTEC), Nanyang Technological University, Singapore.

*Corresponding author: flbo@dtu.dk

Answering the growing demand of food for human consumption, the aquaculture industry has grown considerably for the past decades and is expected to expand further in the future. It is thus critical to ensure that the development of this sector is associated with as low environmental impacts as possible. Even though it is often presented as the most environmentally sustainable source of proteins, seafood farming is associated with multiple environmental impacts such as climate change, eutrophication or biodiversity loss. A widely used tool to assess environmental sustainability of food products is life cycle assessment (LCA), and it has been applied to aquaculture systems in multiple studies over the last 15 years. What can we learn from this pool of LCA studies that will help system developers and decision makers reduce the impacts from the aquaculture sector? Which general trends can be identified to enable drawing recommendations about preferable system characteristics? To answer these questions, we performed a critical review of 65 LCA studies of aquaculture systems. We used meta-level statistical analysis to compare their findings and conclusions with respect to the different types of aquaculture systems. We found that the type of technology used is highly influential on the environmental impacts, and that recirculating aquaculture systems tend to have lower eutrophication impacts than other technologies but higher impacts for other categories of impact. High-intensity systems tend to be associated with high global impacts but lower regional and local impacts, even though some modern and highly optimized systems stand out with low impacts in all impact categories. Generally, polyculture, in particular integrated multi-trophic aquaculture, seems to have lower environmental impacts than monoculture. The choice of aquafeed was also found to be extremely important, as it usually drives the majority of environmental impacts except eutrophication. It should be noted that certain management practices that might impact negatively in LCA could result in positive outcome in other areas, such as lowering health risk through improving water hygiene and avoiding antimicrobial use. Based on these findings, we recommend stakeholders to focus on reducing impacts from the feed and give preference to the technologies highlighted in the above, duly taking into account local conditions.